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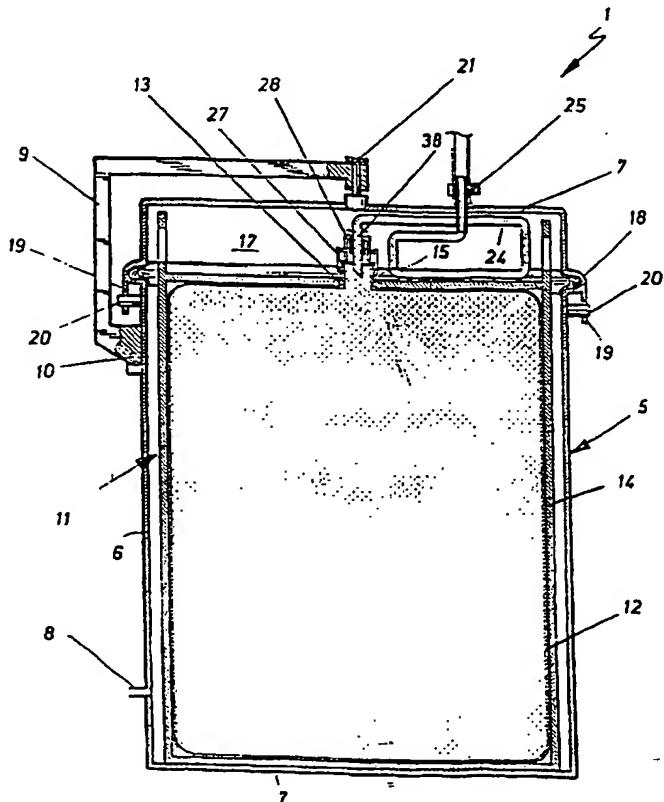
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(54) Title: CONTAINER FOR STORING AND DISPENSING LIQUIDS, PARTICULARLY BEVERAGES

(57) Abstract

A container for storing and dispensing liquids, particularly beverages, includes: a bag (12) made of flexible sheet-like plastics and containing a liquid. The bag is accommodated in an outer hermetic vessel (5) made of substantially rigid material and suitable to accomodate the bag (12). A flexible hose (24) that lies inside the vessel (5) for introducing compressed air in the interspace (17) between its compartment and the bag (12). The vessel (5) has a lid (7) with a peripheral gasket (18) and parts (19, 20) for clamping the rim of the lid to restore the tightness of the vessel after the bag has been inserted. The container has the advantage that it requires a single disposable flexible bag which provides absolute hygiene and has a low cost.



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- 1 -

CONTAINER FOR STORING AND DISPENSING LIQUIDS, PARTICULARLY BEVERAGES

The present invention relates to a container for storing 5 and dispensing liquids, particularly beverages such as wine, milk, fruit juices, and the like, contained in bags made of plastics.

In a second aspect, the invention relates to a bag for 10 liquids that can be used in the above mentioned container.

In the past, devices for storing and dispensing beverages were used almost exclusively for beer. In recent years, these devices have become popular for other beverages as 15 well, especially in cafes, restaurants, and messes, because of their practicality, hygiene, and low operating costs.

The so-called "keg", a cask made of stainless steel suitable to contain beer, wine, and other beverages, has 20 enjoyed and still enjoys widespread use. After being filled, the keg is pressurized with a gas to dispense the liquid by virtue of a tap.

Italian patent application no. 83318 A/87, filed on 20 25 February 1987 by this same applicant, relates to a device for pouring a pressurized liquid which includes a glass demijohn which is encapsulated in a hermetic container and wherein the liquid is pressurized by a gas. The glass demijohn does not explode because the system provides for 30 compensation of the pressures inside and outside the

demijohn.

These known pressurized dispensing systems entail rigid containers which are bulky and expensive and accordingly 5 require large locking up of capital. The recovery, washing, and filling of the containers entail excessive burdens and do not provide the assured hygiene that a disposable container can provide.

10 When plastics suitable to remain in contact with food and beverages became available, alternative flexible containers were introduced. Accordingly, milk and even wine, instead of being stored in conventional glass bottles, are normally also marketed in containers made of composite material, for 15 example a multilayer polylaminated material composed of cellulose paperboard and low-density polyethylene.

Casks made of PET (polyethylene terephthalate) have recently been produced; they have the advantage of being 20 lighter than kegs, cheaper, and equally pressure-resistant.

Containers known as "bag-in-box" have also become rather widespread. These containers are constituted by a bag made of multiple layers of polyethylene and polyester enclosed 25 in a protective holder made of rigid or semirigid cardboard. At the bottom, the bag is provided with a pouring tap that protrudes from the cardboard and allows to draw the contents. As the liquid is dispensed, the bag collapses inside the cardboard holder, allowing the liquid 30 to flow out, with the advantage that the residual liquid

- 3 -

does not make contact with atmospheric oxygen. In this case the liquid flows out by gravity, because the bag is unable to withstand pressure.

- 5 Making a beverage flow out of a container by means of gas pressure is a tested and effective method. In addition to the already mentioned advantages, it keeps beverages intact and protected from alteration since they do not make contact with atmospheric oxygen and it allows to dose and
- 10 adjust the dispensing action at will. Another advantage is constituted by the fact that the pressurized container can be placed far from the tap, for example in a cellar or in another room.
- 15 Systems are also known for dispensing a beverage contained in a flexible bag through a dispensing tap by means of pressure applied to the outside of the pouch.

- Patents GB 2100357, EP 0 276 994, and EP 0 389 195 describe
- 20 pouring devices which include a first flexible bag that contains the beverage and a second expandable flexible bag. Both bags are placed inside an external rigid container. When the expandable bag is pressurized, it presses on the bag that contains the liquid, making the liquid flow out
 - 25 through a dispensing tap.

These known systems use two flexible bags placed inside a rigid container. This increases the cost of the device and entails greater difficulty in manufacture and use.

- 4 -

The aim of the present invention is to overcome the drawbacks described above by virtue of a container for storing and dispensing drinkable liquids that is particularly simple, compact, and cheap, allows absolute 5 hygiene and very easy handling, and entails a minimal environmental impact.

This aim and other objects which will become apparent hereinafter are achieved by a device for storing and 10 dispensing liquids, particularly beverages, which includes: a nonreturnable bag made of flexible sheet-like plastic that contains a liquid; an outer vessel made of substantially rigid material which is suitable to accommodate the bag inside it; a first fluid connection 15 means to allow the liquid to flow out of the bag; a second fluid connection means to allow the controlled introduction of air or of a gas under pressure in the interspace between the vessel and the bag, so as to apply on the bag a pressure for dispensing the liquid; 20 characterized in that the vessel is gas-tight and liquid-tight and has a lid which can be opened to introduce a full bag and has a hermetic closing means that is suitable to restore the tightness of the vessel after the bag has been inserted.

25

The closure means preferably includes a peripheral lid gasket and one or more devices for clamping the rim of the lid against the rim of the vessel.

30 The first fluid connection means can be constituted by a

- 5 -

flexible hose which lies in the interspace and has, at its internal end, a connector that can be removably and hermetically connected to the opening of the bag.

- 5 The length of the portion of flexible hose that lies in the interspace is equal to the maximum height of the vessel, in order to allow the end connector to reach the bottom of the vessel during the emptying and collapse of the bag.
- 10 The end connector includes a main body which slidingly accommodates a rigid tubular part that is connected to the flexible hose and has a pointed end to perforate a membrane that closes the opening of the bag.
- 15 Several advantages are achieved by virtue of this arrangement.

First of all, the system entails the use of a single nonreturnable bag, ensuring absolute hygiene, whereas the outer rigid vessel is meant for unlimited use and thus can be amortized in time.

Since the gas is not in contact with the liquid but presses on the outer wall of the bag, it can be constituted by compressed air, generated by a small compressor or drawn from an external supply line, instead of an inert gas, providing greater practicality and considerable savings.

Differently from conventional systems, the liquid outlet hose does not draw from the bottom of the bag but protrudes

- 6 -

slightly through the opening, approximately flush with the hermetic closure membrane. In this way, when the gas or compressed air presses on the walls of the bag, if air has remained inside, the air flows out first, followed by the 5 liquid, when the dispensing tap is opened. The fact that the air above the liquid is eliminated is highly important for the preservation of the beverage in time.

Additional advantages are constituted by the low cost of 10 the bag, which accordingly makes it unnecessary to recover it, by its low weight, and by its easy disposal, since it can be likened to conventional municipal solid waste.

Furthermore, the bag occupies very little space once it has 15 been emptied, and even when full it is slightly elastic and accordingly adapts very easily to the shape of the rigid container and to the space in which it is stored.

Finally, the bag can be filled up to the level of the 20 connector to avoid contact of atmospheric oxygen with the liquid during storage.

Further characteristics and advantages will become apparent from the description of a preferred but not exclusive 25 embodiment which will be described hereinafter by way of non-limitative example with the aid of the accompanying drawings, wherein:

Figure 1 is a schematic view of a device for dispensing 30 liquids which includes a container according to the

- 7 -

invention;

Figure 2 is a sectional view of a container according to the invention, with a completely full liquid bag;

5

Figure 3 is a sectional view of the container of Figure 2, with the bag partially empty;

Figure 4 is a partially sectional view of the container of
10 Figure 2, open and without the bag;

Figure 5 is a sectional view of a bag according to the invention;

15 Figure 6 is a sectional view of a detail of the bag of Figure 5;

Figure 7 is a sectional view of the detail of Figure 6, with the addition of a further detail of the container.

20

Figure 1 illustrates a system for dispensing drinking liquids and including a container 1, according to the invention, connected at one end to a dispensing tap 2 and at the other end to a source 3 of pressurized gas, for
25 example an air compressor, by means of a pressure reduction unit 4.

With reference to Figures 2 to 5, the container 1 includes an outer vessel 5 made of substantially rigid and non-
30 deformable material, for example steel, aluminum or hard

plastics. Outer vessel 5 includes an upper openable lid 7 and a bottom 6 which has a substantially cylindrical side wall and a flat lower wall.

5 A connector 8 for a tube is provided in the side wall of the bottom 6. The tube connects the internal compartment of the vessel with the compressed air source 3. The lid 7 is rigidly coupled to the side wall of the bottom 6 by an arm 9 which is pivoted at 10.

10

A disposable cartridge or container 11 that contains the liquid or beverage to be dispensed can be accommodated in the internal compartment of the vessel 5.

15 In general, the disposable container 11 can be constituted by a bag 12 made of food-grade sheet-like flexible material, for example PET with a thickness of a few tenths of a millimeter, which has a union 13 made of rigid material, for example filled PET or PVC, that is welded or 20 included during molding. Optionally, but not necessarily, the bag 12 can be placed inside a protective holder 14 made of cardboard or the like, for an easier handling, and for reducing the risk of breakage of its plastic wall. In this case, the union 13 protrudes from the holder 14 through a

25 corresponding opening 15 and is kept in this position, when the bag is completely full, by means of a shaped piece of paperboard 16 which is inserted in appropriate lateral slots of the union 13, as shown schematically in Figure 5. The dimensions of the container 11, optionally of its outer 30 semirigid holder 14, are such as to leave an interspace 17

- 9 -

between the bag and the internal compartment of the vessel
5 for reasons which will be explained hereinafter.

According to the invention, the rigid vessel 5 is gas-tight
5 and liquid-tight and is provided with a means for
hermetically closing the lid 7.

In particular, the hermetic closure means can be
constituted by a two-lip gasket 18 which is accommodated in
10 a peripheral groove of the lid 7 and is suitable to
cooperate with the complementarily shaped rim of the bottom
6.

Along the rim of the lid there are also bayonet-mount
15 brackets 19 adapted to stably engage corresponding pins 20
that protrude from the side wall of the bottom 6, in
angularly equidistant positions, in order to secure the rim
of the lid against the rim of the bottom 6. Conveniently,
the lid 7 can be rigidly coupled to the arm 9 by means of
20 a pivot 21 that allows it to rotate, causing the engagement
of the brackets 19 with the pins 20. It is possible to
provide suitable handles 22 on the lid 7, in order to
facilitate rotation about the pivot 21, and optionally a
safety valve 23.

25

A fluid connection means is provided to allow the liquid
collected in the container 11 to flow out towards the
dispensing device 2. The means is constituted by a flexible
hose 24 which lies inside the vessel 5 and is connected to
30 a union 25 that passes through the upper wall of the lid 7.

- 10 -

The opposite end of the flexible hose is provided with a connector 26 that can be detachably and hermetically coupled to the union 13 of the bag 12. When the internal container 11 is placed in the rigid vessel 5, the flexible 5 hose portion 24 is partially folded back and gathered in the interspace 17. As the bag 12 empties and collapses, the hose 24 uncoils, passing through the opening 15 of the holder 14, whereas the connector 26 follows the union 13 towards the bottom. For this purpose the length of the 10 flexible hose 24 must be equal to the maximum height of the vessel.

The connector 26 can be made of rigid food-grade plastic and can be constituted by an adapter 27 that can be 15 interfaced with the union 13 and by a cap 28 that can be coupled to the flexible hose 24.

The adapter 27 is constituted by a cylindrical body with an axial bore 29, an annular groove 30 whose minimum diameter 20 is slightly smaller than the internal diameter of the cap 28, and a transverse bottom wall 31. Two or more radial pins 32 are inserted in the cylindrical body. Longitudinal fingers 33 extend from the transverse wall 31 and are provided with hook-like ends, 34 that can clamp on an 25 annular ridge 35 of the union. Advantageously, the rim of the union 13 can be closed, after the bag 12 has been filled completely, with a membrane or wall 36 made of semirigid plastic that can be perforated and is applied or melted in place with known methods and has a thinner 30 central region 37.

- 11 -

- The cap 28 has an axial hole that slidingly accommodates a tubular part 38 made of rigid material which is stably coupled to the flexible hose 24. The tubular part 38 has an annular stroke limiting protrusion 39 and an annular rim 40 which retains a compression spring 41 at one end against the bottom of the cap 28 and compresses a gasket 42 at the other end. Furthermore, the free end of the tubular part 38 is cut at an angle so as to provide a perforating point 43.
- 10 Bayonet-mount notches are provided on the cylindrical side wall of the cap 28 and have circumferential portions 44 that couple to corresponding radial pins 32 by means of an axial movement followed by a rotation. During this maneuver, the tubular part 38 perforates the membrane with
15 the point 43 and then compresses the gasket 42 with the annular rim 40. In this position, the point 43 of the tubular part is located slightly inside the membrane and allows to drain the air trapped between the meniscus of the liquid and the membrane 36. This fully eliminates the
20 residual air, further improving the preservation conditions of the beverage.

During use, after lifting the lid 7 of the rigid vessel 5, a disposable container 11, provided with a protective holder 14 or constituted by the flexible bag 12 alone, is inserted in the bottom 6. After coupling the flexible hose 24 to the union 13 and after installing the adapter 27 and coupling the cap 28, consequently perforating the membrane 36, the lid 7 is closed, making sure to gather the flexible
30 hose 24 in the interspace 17 between the internal

- 12 -

compartment of the vessel 5 and the container 11.

- By gripping the lid by the handles 22 and turning it so as to make it rotate about the pivot 21, the brackets 19 are 5 made to engage the pins 20, hermetically closing the vessel 5. At this point it is possible to operate the compressor 3 and open the valve of the pressure regulator 4, injecting compressed air in the interspace 17, so as to apply uniform pressure on the bag 12, causing the liquid to flow out 10 towards the dispensing tap 2. Once the bag 12 has been emptied, it is sufficient to interrupt the supply of compressed air, open the vessel, and replace the empty bag with full one, repeating the above described operations.
- 15 Although the invention has been described in detail with reference to a preferred embodiment, it is evident that the container is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept expressed by the accompanying claims.

- 13 -

CLAIMS

1. Container for storing and dispensing liquids, particularly beverages, comprising:

5 -- a disposable bag (12) made of flexible sheet-like plastics containing a liquid to be dispensed;

-- an outer vessel (5) meant for unlimited use, made of substantially rigid material and suitable to accommodate
10 said bag (12) inside it;

-- a first fluid connection means (24, 26) to allow the liquid to flow out of said bag;

15 -- a second fluid connection means (8) to allow the controlled introduction of air or of a gas under pressure in the interspace (17) between the internal compartment of the vessel and the bag (12), so as to apply a pressure on said bag for dispensing the liquid contained therein;

20

characterized in that said vessel (5) is gas-tight and liquid-tight and has a lid (7) which can be opened to introduce a full bag (12) and has a hermetic closing means (18, 19, 20) that is suitable to restore the tightness of
25 the vessel after the bag has been inserted.

2. Container according to claim 1, characterized in that said hermetic closure means comprises a peripheral gasket (18) for the rim of the lid (7) and parts -(19, 20) for
30 securing the rim of the lid against the rim of the

container.

3. Container according to claim 1, characterized in that said first fluid connection means comprises a flexible hose 5 (24) that lies inside the vessel (5).

4. Container according to claim 3, characterized in that said flexible hose (24) has, at its internal end, a connector (26) that can be detachably hermetically 10 connected to an opening (13) of said bag.

5. Container according to claim 4, characterized in that the length of the portion of flexible hose that lies inside the vessel (5) is equal to the maximum height of the vessel 15 in order to allow the end connector (26) to reach the bottom of said vessel during the emptying and collapse of the bag (12).

6. Container according to claim 5, characterized in that 20 said end connector (26) comprises a cap member (28) which slidably accommodates a rigid tubular part (38) that is connected to said flexible hose (24) and has a pointed end (43) for perforating a membrane (36) that closes the opening (13) of said bag (12).

25

7. Container according to claim 6, characterized in that said end connector (26) comprises an adaptor (27) that can be interfaced with said opening (13) of the bag (12) and can be detachably coupled to said cap member (27), keeping 30 the pointed end (43) of said tubular part (38)

- 15 -

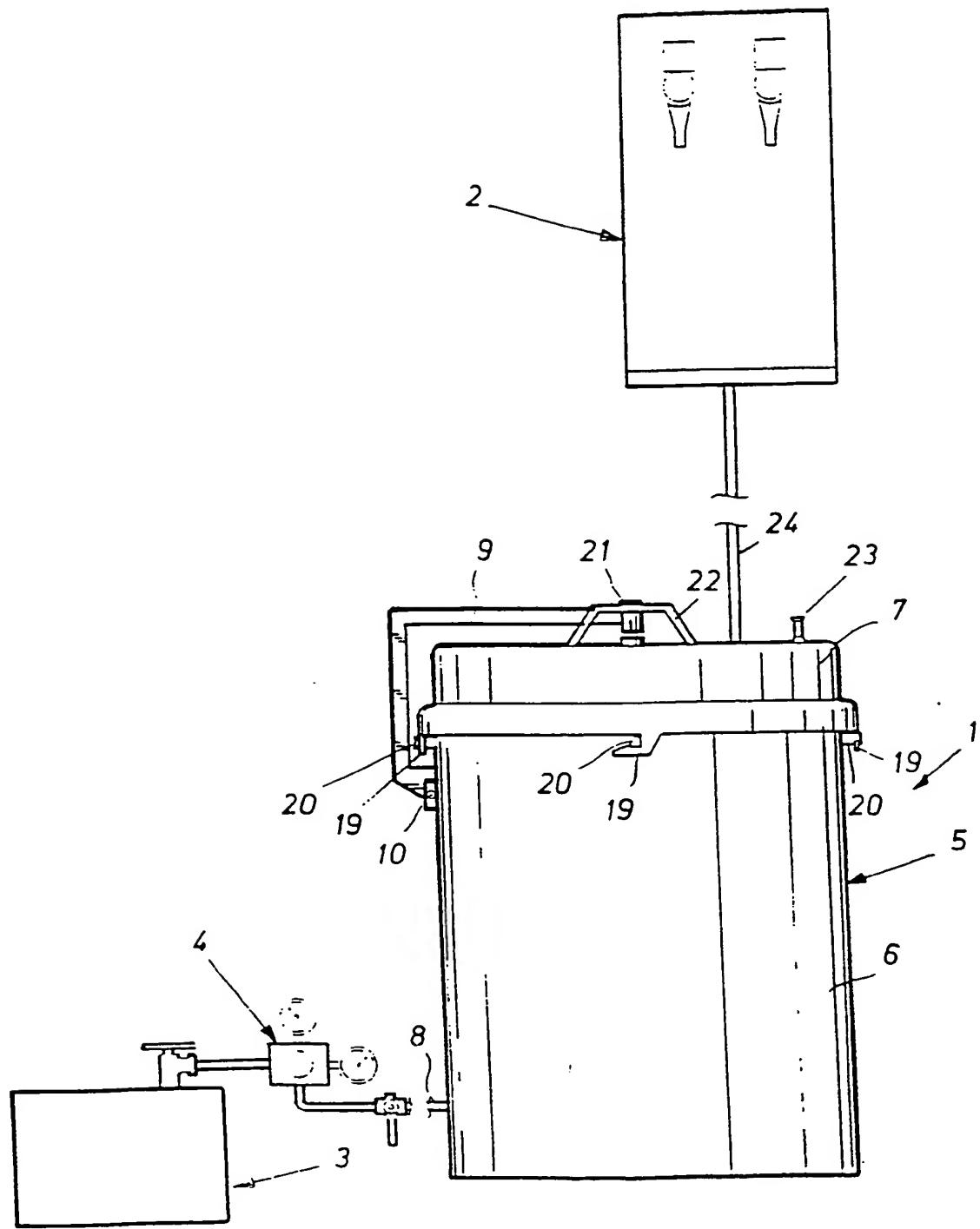
approximately flush with said membrane.

8. Container according to claim 1, characterized in that
said bag (12) is inserted in a protective holder (14) made
5 of semirigid material inside which it can collapse freely.

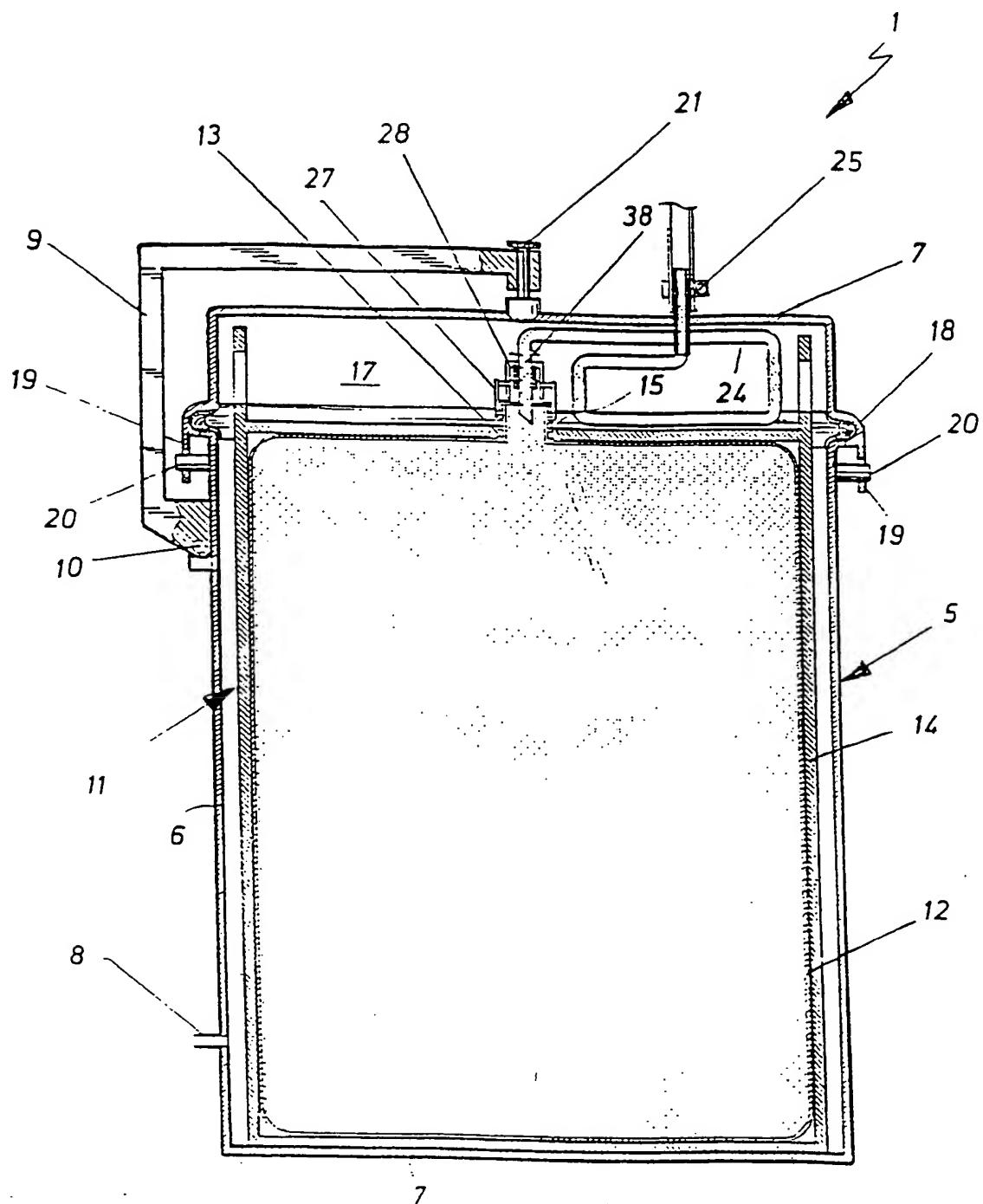
9. Disposable bag for drinking liquids, particularly
beverages, suitable for use in a container (1) according to
one or more of the preceding claims, characterized in that
10 it is made of a flexible liquid-tight and gas-tight laminar
material, and in that it has an opening provided with a
rigid port (13) that is closed by a pierceable membrane
(36).

15 10. Bag according to claim 9, characterized in that it
comprises an outer protective holder (14) made of semirigid
material, inside which said bag can collapse freely, said
holder (14) having external dimensions that are smaller
than those of the internal compartment of the rigid vessel
20 (5) and being provided with a passage (15) for the union
(13) and for the flexible outlet hose (24).

1/6

**Fig. 1**

2/6

**Fig. 2**

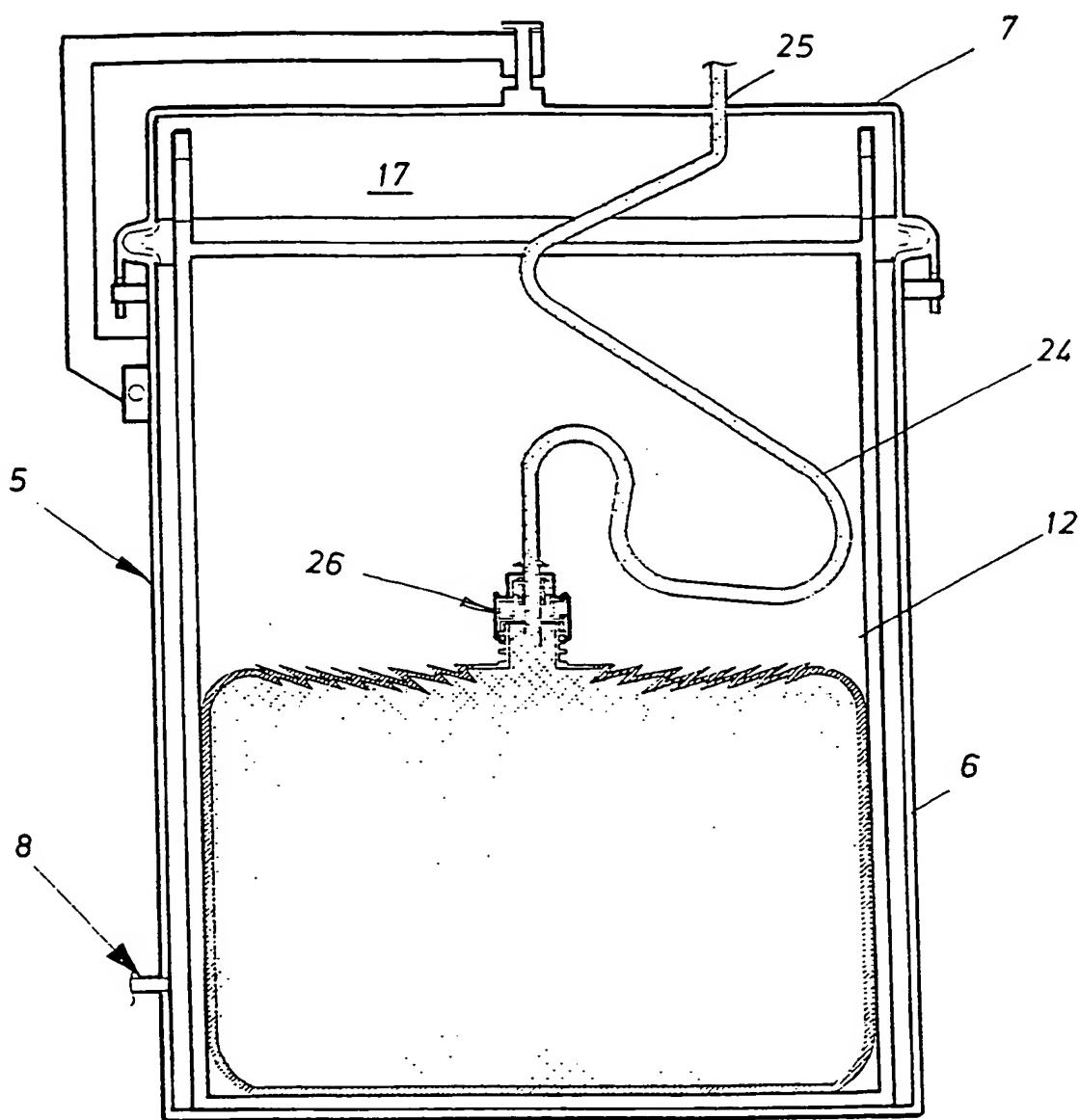


Fig. 3

4 / 6

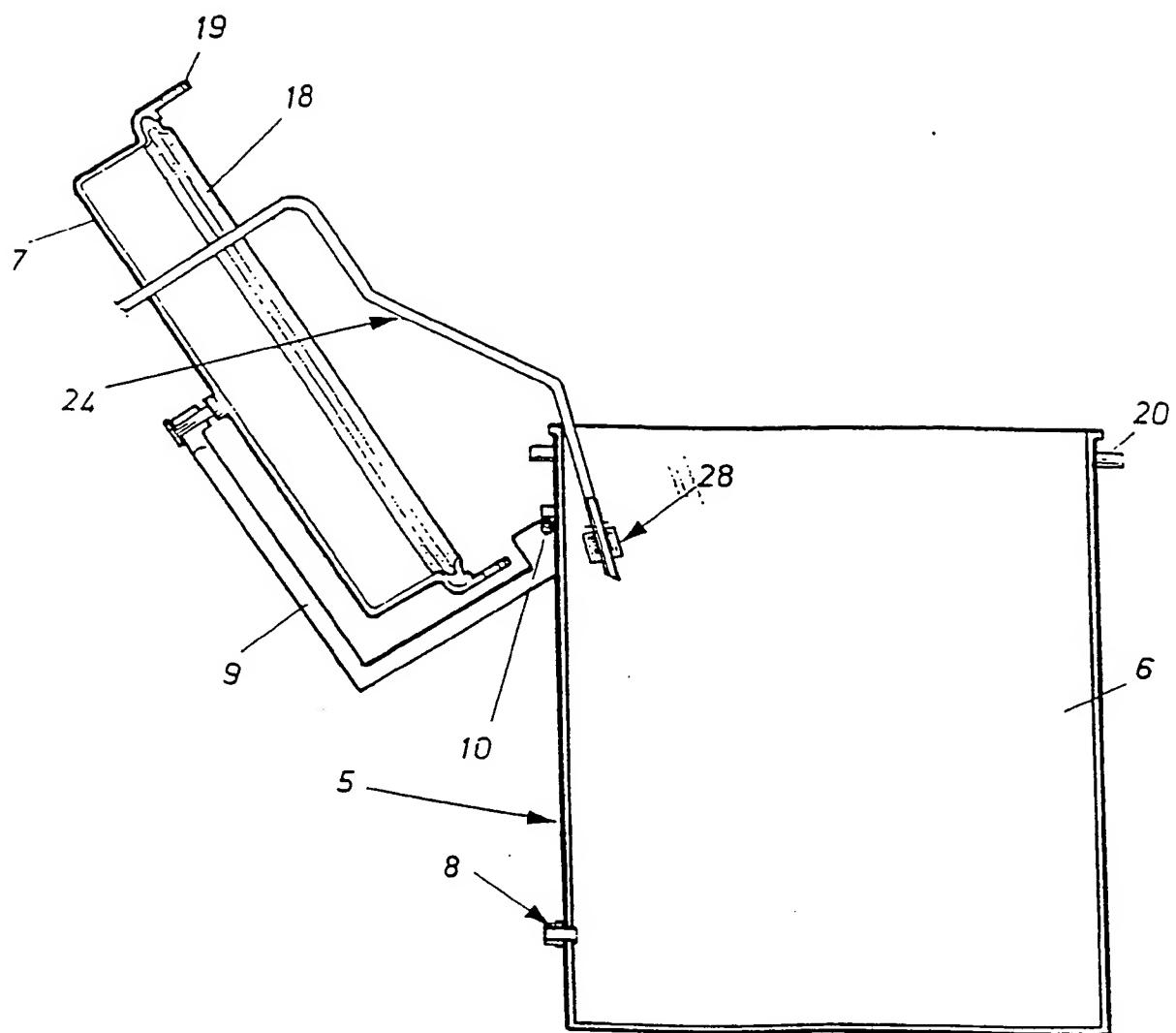


Fig. 4

5/6

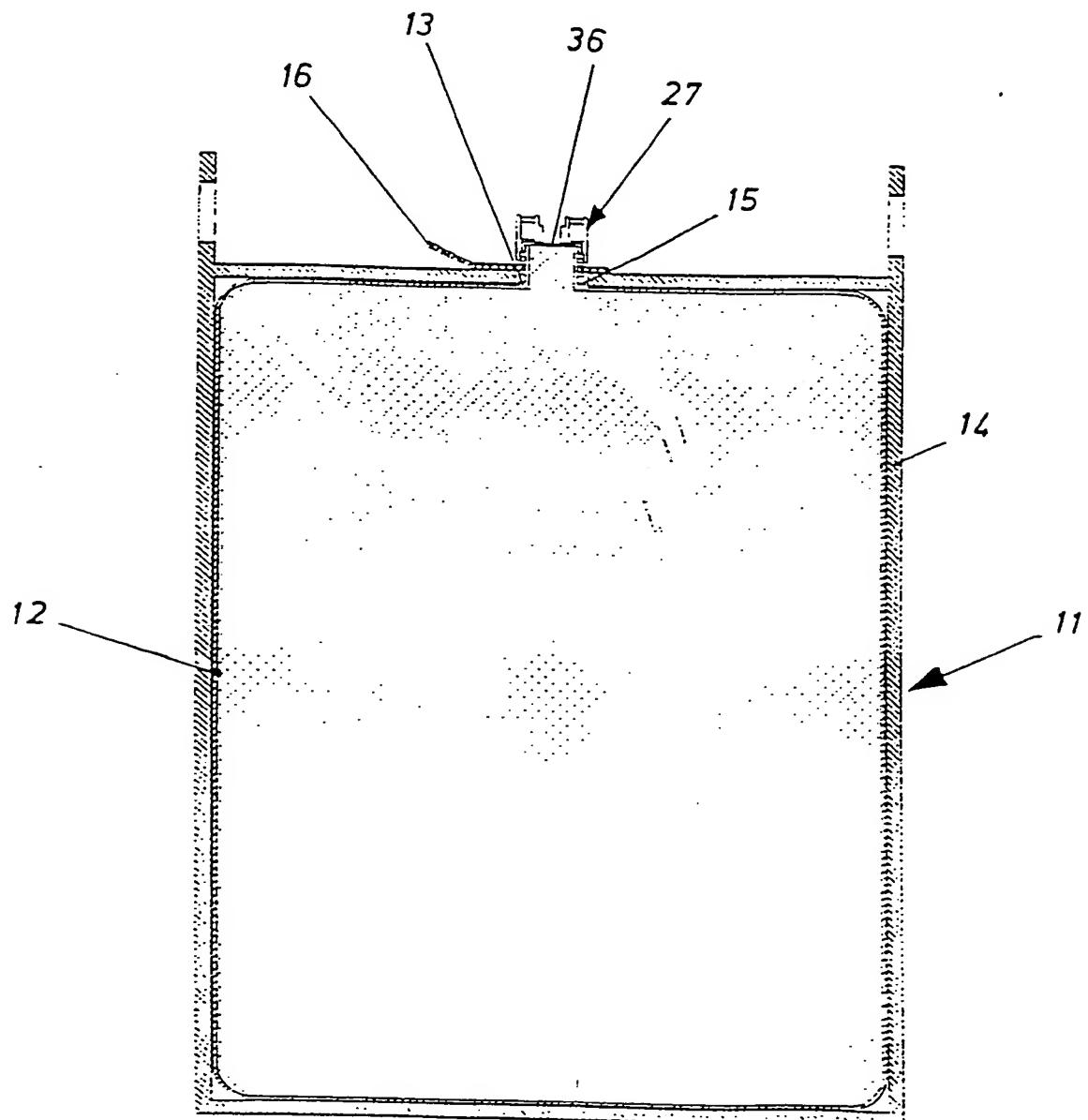


Fig. 5

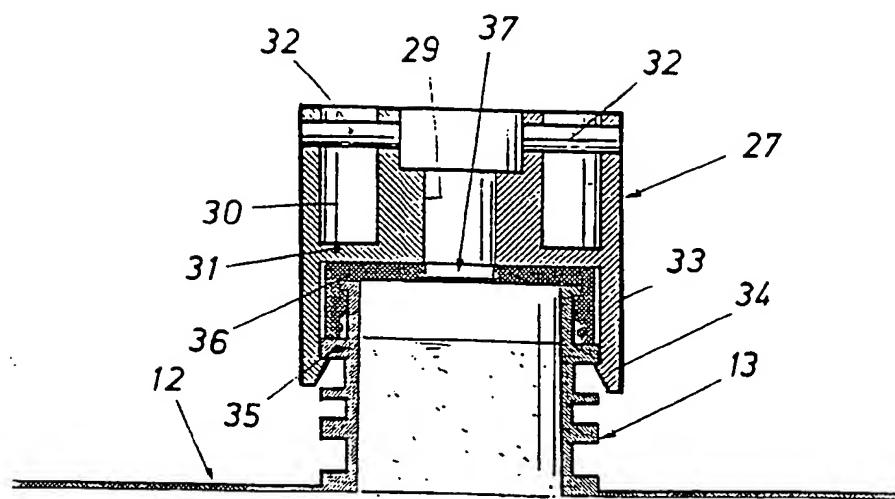


Fig. 6

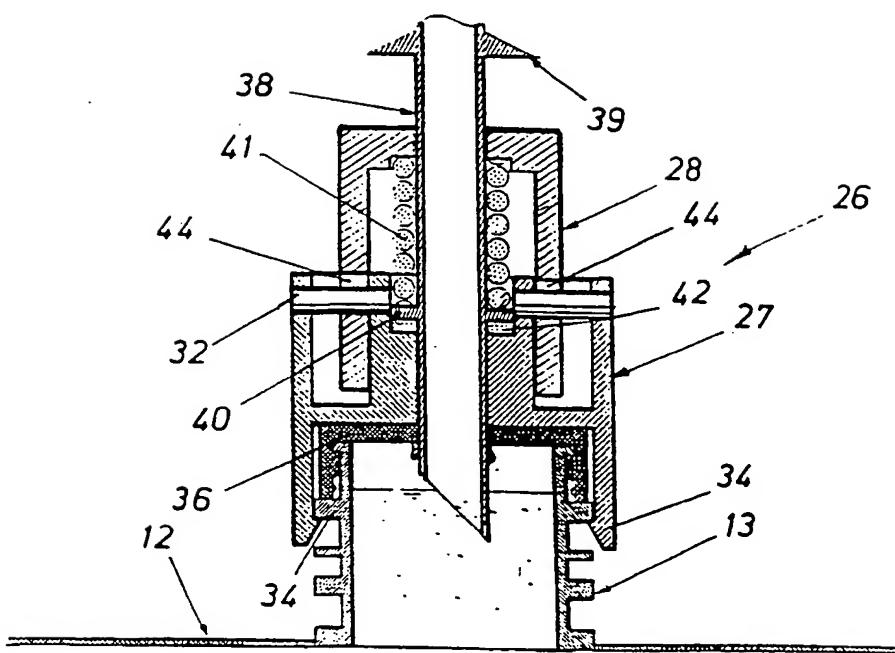


Fig. 7

INTERNATIONAL SEARCH REPORT

Inte... nal Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B67D1/04 B67B7/86

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B67D B67B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB,A,2 146 705 (A. GUINNESS SON AND CO.) 24 April 1985	1-6,9
Y	see page 2, line 100 - line 120 see page 3, line 101 - page 4, line 25; figures	7,8,10
Y	GB,A,2 154 991 (BCL LIMITED) 18 September 1985 see claim 1; figures 1,3	7
Y	WO,A,81 02002 (BOSTRÖM AND ERIKSSON) 23 July 1981 see page 2, line 23 - line 32; figure 1	8,10
A	DE,A,35 10 859 (NILGEN) 2 October 1986 -----	

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Patent family members are listed in annex.

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1 Date of the actual completion of the international search
15 May 1995 Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
GB-A-2146705	24-04-85	NONE		
GB-A-2154991	18-09-85	NONE		
WO-A-8102002	23-07-81	AU-A-	6700781	07-08-81
		EP-A-	0042850	06-01-82
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